Appliance Standards Awareness Project
Consumer Federation of America
Natural Resources Defense Council

May 17, 2021

Mr. Bryan Berringer
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office, EE-5B
1000 Independence Avenue SW
Washington, DC 20585

RE: Docket Number EERE–2020–BT–TP–0029/RIN 1904-AF03: Request for Information for Test Procedures for Portable Air Conditioners

Dear Mr. Berringer:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), Consumer Federation of America (CFA), and Natural Resources Defense Council (NRDC) on the request for information (RFI) for test procedures for portable air conditioners (ACs). 86 Fed. Reg. 20044 (April 16, 2021). We appreciate the opportunity to provide input to the Department.

We encourage DOE to continue to investigate the impact of case heat transfer and methods to incorporate a measurement of case heat transfer in the test procedure. In the February 2015 proposed rule for test procedures for portable ACs, DOE proposed to incorporate a measurement of case heat transfer in calculating cooling capacity, similar to the measurement of duct heat transfer.[1] However, DOE ultimately excluded the calculation of case heat transfer in the June 2016 final rule, stating that case heat transfer would typically have a minimal impact on the measured cooling capacity.[2] We note that while DOE found that the average impact on seasonally adjusted cooling capacity (SACC) was about 2%, the impact for individual units tested by DOE ranged from 0% to 9.1%.[3] Therefore, for some units, the current test procedure may be significantly overestimating cooling capacity. The current test procedure is also failing to capture design differences that may improve efficiency by reducing case heat transfer. We encourage DOE to continue to investigate the impact of case heat transfer and methods to measure case heat transfer to improve the representativeness of the test procedure.

We encourage DOE to investigate the power consumed in network mode and to consider incorporating a measurement of network mode power consumption. DOE notes in the RFI that the Department "has observed that network connectivity typically operates continuously in the background while the portable AC performs other functions."[4] We encourage DOE to investigate the power consumed by portable ACs in network mode, and we continue to encourage DOE to consider incorporating a measurement of the standby power consumed when a portable AC with network

[1] 80 Fed. Reg. 10212 (February 25, 2015).
[2] 81 Fed. Reg. 35255 (June 1, 2016).
[3] Ibid.
[4] 86 Fed. Reg. 20049-50.

functions is connected to a network. Incorporating the power consumed in network mode would improve the representativeness of the test procedure.

We encourage DOE to modify the current waiver approach for variable-speed portable ACs to require that the "full speed" test be conducted using user settings to achieve the maximum cooling capacity. In the test procedure waiver granted to LG for variable-speed portable ACs,[5] the alternate test procedure involves calculating a "performance adjustment factor," which represents the efficiency improvement of the variable-speed unit relative to a "theoretical comparable" single-speed unit. The variable-speed unit is tested using the "full" compressor speed at the 95°F outdoor condition and the "low" compressor speed at the 83°F outdoor condition, with both the "full" and "low" compressor speeds specified by LG. In investigative testing for the March 2021 final rule for test procedures for room ACs, DOE found that two variable-speed room AC models performed differently when tested using user settings to achieve the maximum cooling capacity (without fixing the compressor speed) compared to when tested using fixed compressor speeds.[6] Based on these results, for the final rule, DOE modified the existing waiver approach for variable-speed room ACs to require that user settings be used to achieve the maximum cooling capacity rather than using a manufacturer-specified fixed speed.

In the April 2021 notice of petition for waiver and grant of an interim waiver to Midea for variable-speed portable ACs, DOE concluded that "similar differences may occur" when testing portable ACs using a manufacturer-specified fixed compressor speed compared to allowing the unit to automatically select the compressor speed.[7] DOE therefore modified the Midea waiver application to require that the "full speed" test be conducted using user settings to achieve the maximum cooling capacity and with the thermostat setpoint set at 75°F "as it would be more representative of typical consumer settings than reliance on the confidential manufacturer instructions to achieve maximum cooling capacity."[8]

In incorporating the current test procedure waivers for variable-speed portable ACs into the DOE test procedure, we encourage the Department to require that the "full speed" test be conducted using user settings to achieve the maximum cooling capacity to improve representativeness.

We continue to encourage DOE to investigate a load-based test procedure for portable ACs. While modifying the current waiver approach to require that the "full speed" test for variable-speed units be conducted using user settings would be an important step towards a more representative test procedure, a load-based test would further improve representativeness for both single-speed and variable-speed units. Specifically, a load-based test would capture cycling losses for single-speed units (as well as for variable-speed units to the extent that they exhibit cycling behavior). And for variable-speed units, a load-based test would eliminate the need to use confidential, manufacturer-specified compressor speeds for the "low speed" test.

We encourage DOE to conduct load-based testing of single-speed portable ACs to determine an appropriate cycling loss factor. In calculating the performance of a "theoretical comparable" single-speed unit, the current test procedure waivers for variable-speed portable ACs include an assumed

[5] 85 Fed. Reg. 33643 (June 2, 2020).
[6] 86 Fed. Reg. 16456 (March 29, 2021). Specifically, when operating under fixed temperature conditions, one unit was 10% more efficient than when using a fixed compressor speed at the 95°F test condition, and the other unit was 11% less efficient under fixed temperature conditions compared to when using a fixed compressor speed.
[7] 86 Fed. Reg. 17807 (April 6, 2021).
[8] Ibid.

cycling loss factor for single-speed units to capture the benefits of variable-speed units in reducing cycling losses. In the interim waiver granted to Midea, DOE modified the cycling loss factor to reflect load-based testing conducted by DOE of two single-speed room AC units at reduced cooling loads.[9] We encourage DOE to conduct similar load-based testing of single-speed portable ACs to determine an appropriate cycling loss factor for the portable AC test procedure.

We encourage DOE to adjust the CEER calculation to reflect seasonal efficiency. The DOE test procedure for portable ACs calculates a weighted-average efficiency based on two outdoor air temperatures—95°F and 83°F—with weighting factors of 20% for the 95°F condition and 80% for the 83°F condition. The weighting factors were calculated during the last test procedure rulemaking based on the portion of operating hours that are associated with each of the two outdoor temperature conditions.[10] However, basing the weighting factors on operating hours results in underweighting the efficiency performance at 95°F and overweighting the efficiency performance at 83°F by not taking into account that the cooling provided and the energy consumed during an hour of operation at 95°F are significantly greater than during an hour of operation at 83°F. DOE addressed a similar issue in the March 2021 final rule for test procedures for room ACs.[11] We encourage DOE to adjust the CEER calculation for portable ACs so that the efficiency metric reflects the total cooling provided divided by the total energy consumed.

Thank you for considering these comments.

Sincerely,

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[9] Ibid.
[10] 81 Fed. Reg. 35252.
[11] 86 Fed. Reg. 16460.